

DIGITAL PANEL METER MODEL AP-244A SERIES INSTRUCTION MANUAL



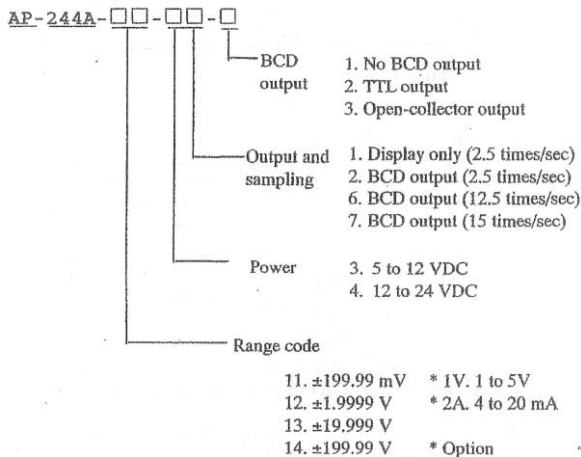
Caution

- (1) The application of voltage or current exceeding its maximum allowable value to the input terminals may result in instrument damage.
- (2) The supply of power out of its allowable range may cause fire, electric shock or instrument failure.
- (3) The content of this manual may subject to change without prior notice for product improvement.
- (4) This manual is carefully prepared. However, if any question arises, or any mistake, omission or suggestion is found in the content of this manual, contact your nearest our sales agent.

1. Before operation

1-1 Checking Model No.

Each of AP-244A Model Nos. is configured as shown in the following, check that the Model No. ordered matches that delivered.



1.2 Checking accessories

The following accessories will come with the AP-244A.

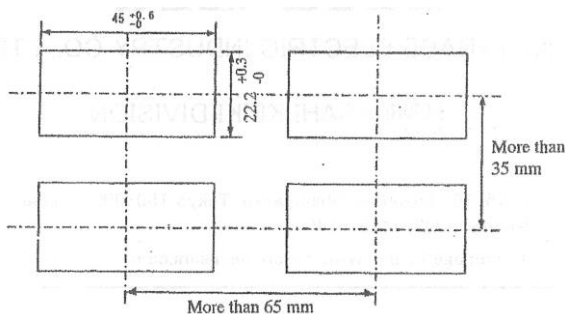
- Lower 10-pin connector 1 pc.
 - Instruction manual 1 copy
 - Upper 26-pin connector 1 pc.
- (Only with BCD output)

If you have any query, please contact our sales agent or Watanabe directly.

1.3 Mounting

1.3.1 Panel cutout dimensions

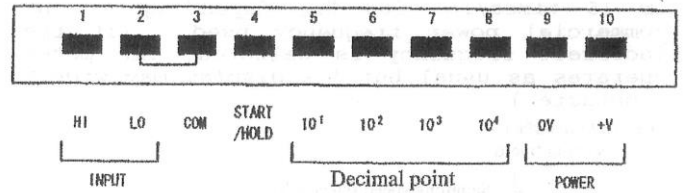
Make the panel cutout for mounting the AP-244A according to the following Fig.



1.3.2 Mounting the AP-244A

When mounting the AP-244A in the panel, push the meter in the panel from the panel front while pressing down the snaps located at the sides of the case.

1.4 Terminal connection diagram



*Do not gradually apply the power supply voltage to the meter but from 0V quickly to the rated voltage. (If the voltage is gradually increased, the meter may not start.)

2. Various functions

2.1 Setting the position of decimal point

The position of the decimal point of this meter can be externally controlled from the lower connector terminals. Short the terminal corresponding to the digit to be lit with the COM terminal.

2.2 Start/hold function

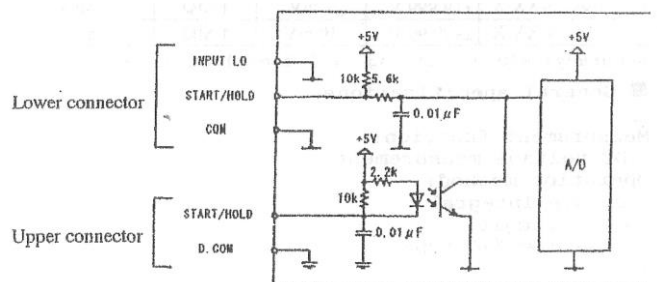
The start/hold function is used to control display hold (measurement stop) and start (measurement start) from the external control terminals.

Measurement is held with the START/HOLD terminal shorted with the COM terminal (or level 0) or started with the START/HOLD terminal opened from the COM terminal (or level 1).

In addition, a positive pulse within one-sampling time exceeding 1 ms enables one-shot measurement.

The function of the START/HOLD terminal wired on the upper side when the BCD output is optionally provided is the same as that described above.

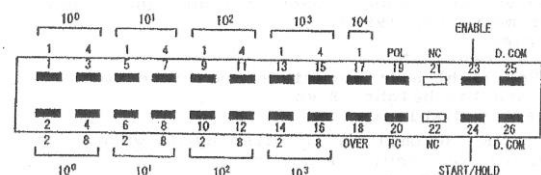
However in this case, the control line is isolated from the input signal line.



2.3 BCD output

This meter can provide the parallel BCD output as option. In addition, for the BCD output of this meter, the input circuit is isolated from the power circuit.

2.3.1 Terminal connection diagram



2.3.2 Output status[() ; For TTL]

Measured data;

Negative logic (Positive logic)

Polarity signal;

Transistor turned on at plus (Logic 1)

OVER signal;

Transistor turned on at OVER (Logic 1)

Printing command output (PC);

Transistor turned on (Logic 1) for about 10 ms every time measurement is complete.

Output capacity;

Max. voltage 30V

Max. current 15 mA (Fanout 2)

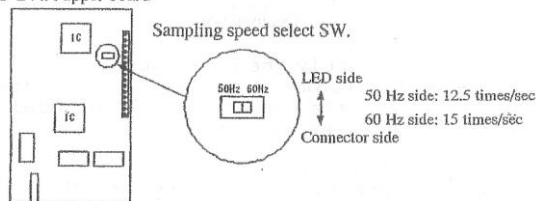
2.3.3 ENABLE

All of the transistors are turned off for the open-collector output or they are set to the high impedance state for the TTL output with the ENABLE terminal shorted with the D.COM terminal or set to level 0.

2.4 Selecting sampling speed

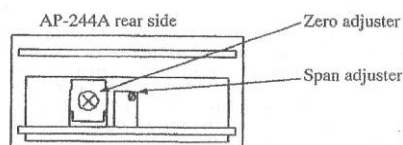
Select a sampling speed of 12.5 times/sec (50Hz) or 15 times/sec (60Hz) depending on the commercial power frequency used. (If the incorrect frequency is selected, the meter operates as usual but its display may widely fluctuate.)

Parts location surface of AP-244A upper board



3. Calibration

In order to calibrate this meter, a standard voltage generator with an accuracy of $\pm 0.01\%$ or higher is required. In addition, for calibration, see the following Fig.



4. Specifications

Model No. / range codes	Measurement range	Max. resolution	Input impedance	Max. allowable Input Voltage
AP-244A-11-XX-X	$\pm 199.99\text{mV}$	$10\text{ }\mu\text{V}$	$100\text{M}\Omega$	$\pm 100\text{V}$
AP-244A-12-XX-X	$\pm 1.9999\text{V}$	$100\text{ }\mu\text{V}$	$100\text{M}\Omega$	$\pm 100\text{V}$
AP-242A-13-XX-X	$\pm 19.999\text{V}$	1mV	$1\text{M}\Omega$	$\pm 250\text{V}$
AP-242A-14-XX-X	$\pm 199.99\text{V}$	10mV	$1\text{M}\Omega$	$\pm 250\text{V}$

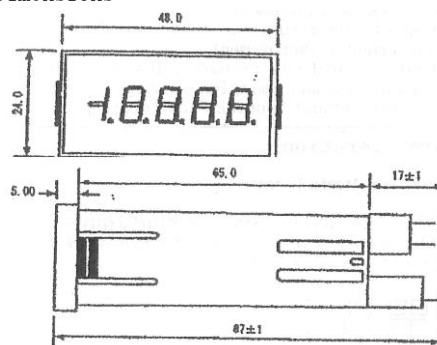
Accuracy: $\pm (0.03\% \text{ of rdg.} + 1 \text{ digit})$ at $23^\circ\text{C} \pm 5^\circ\text{C}$

■ General specifications

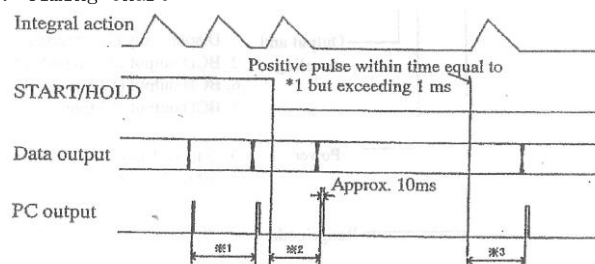
Measurement function	: DC voltage measurement
Operation method	: Double integral
Input circuit	: Single-ended type
Max. display	: 19999
Sampling speed	: 2.5 times/sec. 12.5 times/sec (50Hz) or 15 times/sec (60Hz)
Noise rejection ratio	: NMR, More than 50dB (50/60Hz)
Overrange warning	: "0000" or "-0000" flashes for an input signal of more than 19999.
Display	: 7-segment LED (Red light emitting diode numeric element) character height, 8mm
Polarity display	: " - " is automatically displayed when the computation result is minus.
External control	: HOLD . . . Shorting START/HOLD terminal with COM terminal (or level 0) START . . . Opening START/HOLD terminal from COM terminal (or level 1)
Operating temp/humidity range	: 0 to 50°C / 35 to 85%RH
Power supply	: 5 to 12V DC $\pm 5\%$ 12 to 24V DC $\pm 10\%$
Consuming current	: At 5V DC . . . Approx. 100mA (BCD not provided) Approx. 220mA (BCD provided) At 12V DC . . . Approx. 50mA (BCD not provided) Approx. 100mA (BCD provided) At 24V DC . . . Approx. 30mA (BCD not provided) Approx. 60mA (BCD provided)

Dielectric strength	: Between L0 input and 0V power terminals . . . For 1 min. at 500V DC Between L0 input and D.COM output terminals . . . For 1 min. at 500V DC Between 0V power and D.COM output terminals . . . For 1 min. at 500V DC Between L0 input terminal and case . . . For 1 min. at 1500V AC
Insulation resistance	: Between each terminal described above . . . More than $100\text{M}\Omega$ at 500V DC
Dimensions	: $48(\text{W}) \times 24(\text{H}) \times 87(\text{D})\text{mm}$
Weight	: Approx. 50g
Accessories	: Lower 10-pin connector . . . 1pc. Instruction manual . . . 1 copy Upper 26-pin connector . . . 1pc. (Only for BCD output)

5. Dimensions



6. Timing chart



*1: 2.5 times/sec ... 400 ms, 12.5 times/sec ... 80 ms, 15 times/sec ... 66.7 ms
*2: Within time equal to *1 plus 10 ms
*3: Within time equal to *1 plus 10 ms

7. Warranty and after-sale service

1) Warranty

This meter is warranted for a period of one year from date of delivery. Any defect which occurs in this period and is undoubtedly caused by Watanabe's faults will be remedied free of charge. This warranty does not apply to the meter showing abuse or damage which has been altered or repaired by others except as authorized by Watanabe Co., Ltd.

2) After-sale service

This meter is delivered after being manufactured, tested and inspected under strict quality control. However, if any problem does occur, contact your nearest Watanabe sales agent or Watanabe directly giving as much information on problem as possible.

watanabe
WATANABE ELECTRIC INDUSTRY CO., LTD.

6-16-19, Jingumae, Shibuya-ku, Tokyo 150-0001, Japan
Phone: (81)3-3400-6141

Homepage <http://www.watanabe-electric.co.jp/en/>